

## PRACTICAL HINTS



**THE MOSQUITO.**—In the last two years the mosquito has risen to high rank in economic importance, and his—or rather her—absence from man's environment is more than ever desirable, for from being an ordinary pest science has proved her pestilential, and upon her narrow but well humped-up shoulders is placed the burden of causing, or at least transmitting, two of the most widespread and dangerous diseases of tropical and semitropical climates, viz., malaria and yellow-fever.

There is probably no more interesting page in the history of biological investigation than that which relates to the life-cycle of the lowly organism that causes malaria. After years of patient and painstaking work this has been proved to be a low animal form called a plasmodium, and not a vegetable form or bacteria. It was first discovered by an Italian investigator named Laverau.

The primary origin of the plasmodium is still unknown, I believe, but its history after introduction into the human body may be summarized as follows: At once, after obtaining entrance into the blood-current, the little animal penetrates into the red cells and lives apparently upon the red coloring-matter of the blood. After it reaches its full growth it divides into a number of parts, each part being a spore and capable of penetrating and living upon a fresh blood-cell when they are set free by the bursting of the walls of the cell in which they have developed. This occurs when the subdivision of the organism is completed. The bursting of the blood-cell walls, or sporulation, as it is called, is practically simultaneous for all the cells that have been infected at one time, and the sudden invasion of the blood-current by the immense number of spores suddenly set free causes the chill or rigor so characteristic of malaria. This cycle of cell invasion by the plasmodium, subdivision of the organism, and sporulation may go on indefinitely if not checked by medication. It is during the comparatively short period of time while the spores are floating free in the blood-current that quinine exerts its poisonous effect upon the parasite, the walls of the blood-cell protecting it from the effect of the medicine at other times. As long as the plasmodia remain in the human body the above-described sequence of changes occurs, but as soon as they are removed an entirely different development takes place. Some grow large only, others throw out slender filaments which separate from their parent body and fuse with the larger non-flagellating forms. This is the true sexual generation of the parasite. So far the change may go on anywhere outside of the human body, but it is only in the stomach of the mosquito, and only in that of the one genus, *Anopheles*, that a further development will occur. Here the fertilized organisms attach themselves to the walls of the stomach and penetrate it to its outer muscular coat, where they locate and begin to grow. After increasing about five times their original size they rapidly subdivide into a great number of small, spindle-shaped cells, called blasts. The continued growth of these blasts finally bursts the walls of their parent and also the muscular coat of the mosquito's stomach at the same time, and they are thus liberated into the body-cavity of their host. Being endowed with great activity, they penetrate into any and all parts of the mos-

quito's structure. Now the one thing that heretofore has caused mankind to curse the mosquito as a pest is its power to poke a somewhat elongated proboscis through a man's skin in order to suck from him a modicum of his blood. As the blood does not always flow readily, the mosquito injects a little dissolving fluid, which has the desired effect from the mosquito's stand-point but is most irritating to man. This so-called poison of the mosquito is its saliva, which is secreted from two glands that lie under the œsophagus and empty into the proboscis. The blast enters these salivary glands as well as other parts of the mosquito's body, and are injected with the saliva into the blood of any person who is unfortunate enough to be bitten. Once introduced into the blood-current, they penetrate the red blood-cell, develop, and by sporulation bring on the malarial spasm.

To prove the correctness of this theory of the cause of malaria three heroes of science exposed their lives and health to a series of experiments, the most striking of which was the following:

Two of them lived day and night upon the heretofore deadly Roman Campagna, slept with their windows open, living as they would elsewhere with the one exception of not stirring outside of their hut during the time when it is known that the *Anopheles* is abroad and also in having the windows and doors of their dwelling perfectly protected by screens. For three of the most dangerous months they remained in perfect health, although the inhabitants of the neighboring villages were suffering from malaria in all its forms.

As a central experiment some mosquitoes of the *Anopheles* genus that were known to have sucked the blood of a person sick with malaria were sent to London, England, and there the third hero, the son of a physician, a young man known to be free from disease and who had never been exposed to a malarial infection, permitted them to bite him, and in due course sickened with a severe type of intermittent fever.

These experiments and the biological investigation that I have hastily sketched, seem to prove conclusively what I stated in my opening paragraph, that the mosquito has risen to a high position in economic importance.—R. M. M., in *The Hospital Review*.

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RELIEF FROM FLIES AND MOSQUITOES.—It is not known, perhaps, to all nurses that flies and mosquitoes hate the smell of lavender. In my nursing I managed to secure sleep for a fly-tormented patient in the following simple way: Pour into an atomizer half a teaspoonful of the oil. Add to this as much alcohol as will make a saturated solution. Lightly spray a pillow with this, and place it under the patient's head. If the flies are very bad, cover the eyes and nose, and spray hair, night-dress, and bed-clothes. Not a fly will come around while the odor is perceptible.

H. C. L.

